Minolta Scanner Plugin

For Geomagic Studio 6, Qualify 6, and Qualify 7

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The Minolta Vivid 700 and Vivid 910 are non-contact 3D digitizers that scan an object on or without a turntable. [See Konica Minolta Photo Imaging U.S.A., Inc. at www.minoltausa.com.] The Vivid 700 and Vivid 910 can be controlled by Geomagic Studio and Geomagic Qualify.

The purpose of this (or any) scanner plugin is to eliminate the need to import scan data into Geomagic products. With the plugin, scanned data exists in the Geomagic Model Manager immediately after the data capture process.

In This Chapter

- For reference information on the controls and indicators of the Minolta Scanning plug-in, see Controls and Indicators on 3-1.
- For a sample scanning procedure, see Minolta Scan -- Step-by-Step.

Controls and Indicators

The controls and indicators on the **Minolta Scan** dialog (some not available with the Vivid 700) are divided into three categories: General, Camera, and Turntable.

General Controls

- **Name** (text field) - is the name assigned to the next scan, in the form *text*-*degree*, where *degree* is 0 to 360. The *degree* part increments by the amount configured at **Rotation Step** each time the **Next** button is pressed.
- **Scan** button - initiates a laser scan named in the **Name** field. To re-scan an object from a given angle, press **Scan** instead of **Next**.
- **Next** button - function depends on the **Scan Mode**:
  - when **Scan Mode** is Single, saves the previous scan in the Geomagic Model Manager,
  - when **Scan Mode** is MultiShot, saves the previous scan in the Geomagic Model Manager, increments the *degree* part of **Name** by the amount configured at **Rotation Step**, and rotates the turntable by that amount. When you are ready for the next scan, click **Scan**.

  - when **Scan Mode** is Continuous, saves the first scan in the Geomagic Model Manager, increments the *degree* part of **Name** by the amount configured at **Rotation Step**, rotates the turntable by that amount, initiates another laser scan, and continues according to the description of continuous scan mode below.
- **Show Current Scan Only** checkbox - specifies whether to show only the most recent scan in the Studio 6 or Qualify 6 Viewing Area, or a composite of all scans. This is useful in determining the quality of the most recent scan.

Camera Controls

- **Fine Scan** and **Fast Scan** radio buttons - specify a slower, higher-resolution scan or a faster, lower resolution scan.
- **Dynamic Range Expansion Mode** checkbox (default On) - specifies that 3 varying-intensity passes of the laser beam be made at every angle to improve color detection.
- **Auto Focus** checkbox - Specifies whether the camera uses automatic focusing. When **Auto Focus** is turned off, use the **Distance** control to focus manually.
- **Distance** thumbwheel (500 to 3000 millimeters; applicable when **Auto Focus** is Off) - specifies the distance between the lens and the focal point.
- **Auto Intensity** checkbox (default On) - specifies that the beam intensity be selected by software based on reflectivity of the object. When deactivated, set **Laser Power** by hand.
- **Laser Power** slide bar (simultaneously controls **Laser Power** in the range 1 to 100 *and* **Gain** in the range 1 to 100; applicable when Auto Intensity is off) - controls the intensity of the laser beam and the CCD gain. Higher intensity is suitable for darker colors, lower intensity for lighter colors. When Laser Power reaches 100, the same slider starts to control CCD gain. Use CCD gain only when Laser Power of 100 is insufficient because the object reflects light, transmits light, or has low reflectance for red and similar colors.
- **Variable Distance Mode** checkbox (default Off) - specifies whether to focus at more than one distance to increase the scan quality of “deep” objects. When enabled, the number of focal points is set by **Number of Scans**.
- **Number of Scans** (2 or 3, default 3; applicable when **Variable Distance Mode** is On) - specifies the number of focal points. Two focal points means one close point and one far point, the two points being **Distance Increment** apart. Three focal points means one close point, one point at the detected center of the object, and one far point, each point being **Distance Increment** apart.
- **Distance Increment** (10 to 100 millimeters, default 50; applicable when **Variable Distance Mode** is On) - specifies the distance between each of two or three focal points.

- **Show Image Window** checkbox - specifies whether to display a separate Image Viewer window containing a color image of the object and a color-encoded range map of the object. The **Enable Streaming Video** checkbox on the Image Viewer window specifies whether to update the image in real time, useful while the operator positions an object in the scanner's field of view.

Turntable Controls

- **Current Position** field (0 to 360) - is an indicator *and* control of the current position of the turntable with respect to the zero position.
- **Rotation Step** field (1 to 359; default 45; applicable when **Scan Mode** is MultiShot or Continuous) - specifies the number of degrees of rotation of the turntable per click of the **Next** button.
- **Scan Mode** (Single, Multishot, Continuous):
  - **Single** - This mode can be used to take individual shots, and is the only mode available when the turntable is disabled.
  - **MultiShot** - causes the turntable to rotate by Rotation Step degrees and a new scan to take place every time the user presses **Next**. During a MultiShot process, click **Next** to move on to the next scan, or adjust the parameters and click **Scan** to re-scan the object at its current position.
  - **Continuous** - is similar to MultiShot mode except that scanning and rotation are non-stop (without pressing **Next**) until the **Current Position** reaches 360 degrees or less (until **Rotation Step** would cause **Current Position** to exceed 360 degrees).
- **Reset Zero** button - defines the current position of the turntable as the home (zero) position.
- **Calibrate Axis** button - prompts the user to install the axis calibration "chart" onto the turntable, performs the calibration, and displays the axis in the Viewing Area.

Configuration Controls

- **Configure** button - activates the Minolta Scan Configuration dialog. The controls there are:
  - **Vivid Model** (900/910 or 700) - specifies the Minolta model in use.
  - **SCSI Id** field - indicates the address of the Minolta device detected at system boot. Do not modify.
  - **Turntable type** - The choices in the pulldown menu correspond to Minolta-supported model numbers.
  - **Turntable COM Port** (COM1, 2, 3, or 4) - specifies the serial port to which the turntable is connected.
  - **Disable Turntable** checkbox - specifies whether to disable the turntable (and the turntable controls and the MultiShot and Continuous Scan Modes in the Minolta Scan dialog).
  - **Always Prompt User for Axis Calibration** checkbox - specifies whether Studio/Qualify prompts the user to calibrate the turntable axis

every time the Minolta Scan plugin is started. Experienced users can disable the prompt with this option. To perform the calibration, see the explanation of the **Calibrate Axis** button.

- **Angle (degrees)** (0 to 90 degrees; default 75) - specifies the "maximum divergence from perpendicular" of surfaces whose points are to be captured. A point whose surface normal is more than **Angle** degrees away from parallel to the beam direction will be ignored. Example: If you are scanning a ball at an **Angle** of 75 degrees, scan data would be collected from points whose normal is up to 75 degrees away from the closest point to the camera (for a total of 150 degrees across the face of the ball).
- **Version** - indicates the version of this Minolta Scan software plugin for this Geomagic product.

Data from a Minolta Vivid 700 or 910 scanned directly into a Geomagic product with the **Minolta Scan** tool is handled as ordered data.

Minolta Scan -- Step-by-Step

This is a typical, simple procedure for performing a scan with the turntable.

1. Click the Minolta icon , or select **Plugins > Minolta Scan** on the Geomagic toolbar.
2. Place the calibration chart on the turntable, click **Calibrate Axis**, wait for the center axis to appear in the Viewing Area, and remove the chart from the turntable.
3. Set the values in the Minolta Scan dialog appropriately. Most notably, set **Scan Mode** to Multishot and **Rotation Step** to 45.
4. Place an object on the turntable.
5. Set the **Show Image Window** checkbox, and set **Enable Streaming Video** on the Image Window, and move the object on the turntable until the object is well framed in the Image Window.
6. Disable **Enable Streaming Video** and **Show Image Window**.
7. Press the **Scan** button in the dialog. See the first scan in the Viewing Area.
8. Press **Next**. The table rotates 45 degrees, a scan is performed, and the second set of scan data appears in the Viewing Area.
9. Set **Show Current Scan Only** to see a separation of the first scan and second scan.
10. Un-set **Show Current Scan Only**.
11. Perform additional scans at new angles by pressing **Next** several more times, allowing time for each scan to complete.

12. The several scans appear in the Viewing Area to be a single merged object, but they are not. They are simply a set of scans that occupy the same position in space.
13. Press **OK**. Click the Model Manager tab to see that each individual scan appears as a separate object. To create a single merged object, use **Points > Merge**.